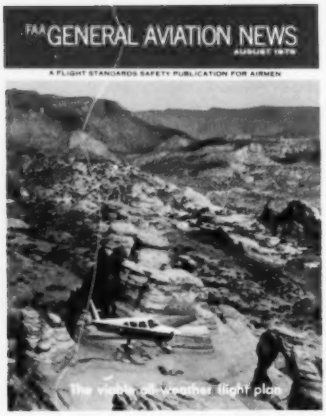
FAA GENERAL AVIATION NEWS

AUGUST 1976

A FLIGHT STANDARDS SAFETY PUBLICATION FOR AIRMEN

The viable all-weather flight plan



COVER:

Airborne tourists over
Arches National Monument,
north of Moab, Utah.

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 15, NO. 4

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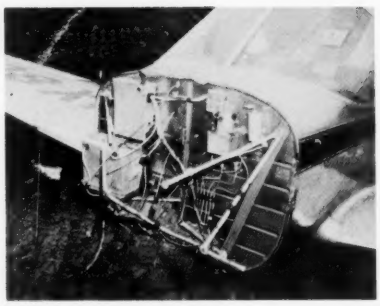

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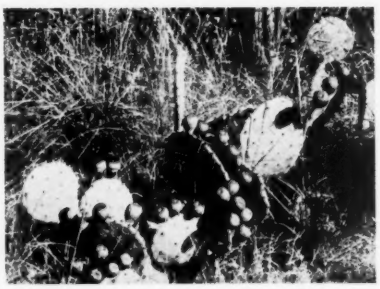

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A Viable Alternate

How to avoid fatal weather traps on holiday weekends

Labor Day marks the end of the summer flying season, and for many pilots it is the final opportunity of the season to use the airplane to good advantage—to bypass the crowded highways and get in a long weekend at a secluded fishing hole, an ocean beach, or a mountaintop hideaway. Unfortunately the weather does not always cooperate, and when it does not, the temptation to disregard safe flying practices in order to enjoy that last summer fling has taken a costly, unnecessary toll of human lives.

National Transportation Safety Board statistics for the last three Labor Day weekends (1973-75) reveal that there were 164 general aviation accidents on U.S. soil, excluding aerial applications, in those three-day periods, including 29 fatal accidents which involved 67 fatalities. (See accompanying charts.)

The statistics show that the cause factors of those accidents are essentially the same as those listed for general aviation accidents during the remainder of the year. But there is one cause factor which is particularly distinctive of the holiday weekend: continuing a VFR flight into adverse or IFR weather.

The pressures that push a VFR pilot, on this holiday, to penetrate weather that is clearly beyond his competence are easy to understand. Long range plans may have been made, hotel rooms reserved, deposits paid, arrangements to meet with relatives and friends carefully worked out. The prospect of missing out on this last opportunity of the season for some long overdue recreation, plus the inevitable chagrin of disappointing friends who planned to fly with the pilot, conspire to overrule his good judgment. He may start out on the flight, in spite of a bad weather forecast, in the hope that it will improve en route; and find enough bright spots between the clouds to nourish his hopes, but eventually discover he is trapped in a storm neither he nor his airplane can handle.

An unfortunate flight of this kind originated from Columbus, Ohio, on the Labor Day weekend of 1974. A group of six men who were all keen on deep sea fishing, and had little opportunity during the year to visit the seashore, worked out a plan to charter a boat from Atlantic City. They secured hotel reservations, acquired abundant fishing gear and clothes, and rented an airplane locally, a *Cherokee Six*.

The pilot of the group was a 49-year old supervisor of a utilities firm. Comparatively recently certificated, he had a total of 140 hours and very little instrument experience. But he foresaw no difficulty with the 450 mile trip. He planned a dawn departure on the Saturday preceding Labor Day, which would enable them to be out on the Atlantic before noon. For several weeks before the day of departure the six friends could think or talk of little else but the coming adventure at sea.

But as the weekend approached, weather moved in over the eastern seaboard and thunderstorms were forecast for a broad area including much of the Appalachian Mountains. Late Friday night the pilot called his friends and sadly informed them they would have to scrub the flight for Saturday. However, improved conditions were forecast for Sunday, and if they got off at

first light they could still salvage most of the day for fishing. They telephoned Atlantic City to hold the boat and their hotel rooms, and turned in early.

All except the pilot, who at 8:19 in the evening called Columbus FSS for a weather briefing. He learned that Sunday's weather was now expected to be a replica of Saturday. He was advised to check again in the morning before departing.

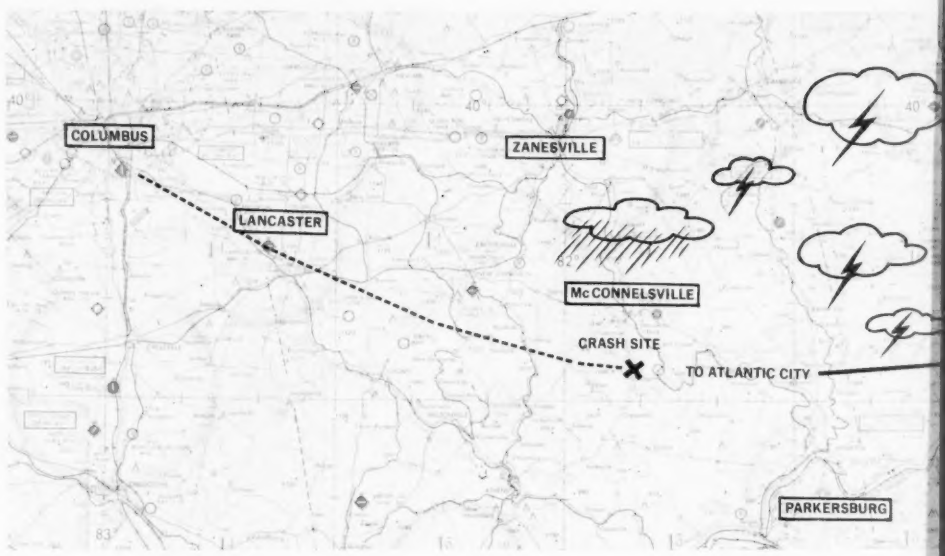
The possibility of having to cancel the trip altogether had become a probability—which the pilot did not wish to accept. He spent an hour poring over charts and calculating how far south he would have to detour in order to skirt the worst of the weather. After snatching a few hours sleep he visited the Columbus FSS for a weather briefing at 2:30 a.m. Thunderstorms were reported at Columbus, and Zanesville FSS reported thunderstorms over the airport moving northeast and lightning visible to the southeast.

The pilot was also given surface weather reports and terminal forecasts for a course to the south, which would take him through Parkersburg. Morgantown and Martinsburg, West Va. The *area forecast*, issued at 8:40 Saturday evening and valid through 3:00 p.m. on Sunday, included the following *significant clouds and weather statement* for southern Ohio: "Scattered to broken 3,000-5,000 and broken 10,000 with chance ceiling lowering to 1,000 feet broken and visibilities becoming reduced 2-4 miles in showers and thunderstorms until 2300 (11:00 p.m. Eastern Daylight Time Saturday). Thereafter, no significant clouds with visibilities 3-5 miles in fog and haze, occasionally 1-3 miles in fog between 0600-0900. . . ."

As the pilot was getting his briefing, his friends were already gathering at the ramp, baggage and fishing gear in hand, anxious to get started on the trip. The pilot decided to give it a try. The weather was apparently moving off to the north; he could take the southern route, skirting any remaining clouds he might encounter on the way. When he filed a VFR flight plan to Atlantic City by telephone, he learned that Zanesville was now IFR. The group started to load their gear on board the *Cherokee*.

In his concern over the weather, the pilot apparently did not take time to tally up his cabin load carefully. His friends were rather large men, all scaling in the area of 200 lbs. They also loaded on board a quantity of fishing gear and an ice chest containing beer and soft drinks. The maximum allowable gross weight for the Cherokee was 3,400 pounds, but by the time all six of them and their gear were on board the weight was 3,595 pounds (according to later calculations by NTSB), about 195 pounds overweight. There are also indications that the loading may have exceeded the aft center of gravity limitations.

They departed Columbus at 3:45 a.m., and shortly after takeoff the pilot activated his VFR flight plan. He was advised to contact Zanesville FSS for later weather information. There is no record of his having done so. The aircraft proceeded southeast passing over Lancaster, Ohio, and flying on toward McConnelsville and Parkersburg to avoid the weather reported to the north.



For the first 30 minutes the flight proceeded without any reported difficulty. However, as they approached McConnelsville, about 20 miles south of Zanesville, the pilot encountered heavy rain showers and dense clouds. What he may not have known is that a change had taken place in the weather picture, prompting the Weather Service to issue an AIRMET shortly after the vacationers had taken off, at 4:05 a.m. This was followed five minutes later by a SIGMET which called for flight precautions in western and central Ohio for ". . . *embedded thunderstorms, occasionally in short lines or clusters. Thunderstorms spreading northeastward along front into northern panhandle of West Virginia.*"

The predicted storm activity lay directly across the *Cherokee's* flight path. The SIGMET and AIRMET were broadcast on the FSS frequency, but it is not known whether the pilot was listening.

At 4:30 a.m. a witness on the ground, an experienced pilot who was camping in the woods nearby, heard what sounded to him like an aircraft in trouble. He had the impression that ". . . *the craft was in a dive with full power and it sounded like the engine was about to come apart. Just before he hit the ground the engine sound died down for about a second and then full power again and he hit about ½ mile from my camp site. The weather at the time was intermittent heavy rain showers.* . . ."

Other witnesses reported hearing the aircraft traveling in circles just before the crash. Investigators later concluded that excessive gross weight and aft C.G., as well as the weather, contributed to the pilot's loss of control of the aircraft, which preceded overstress and inflight structural failure. The aft half of the horizontal stabilizer ripped off, followed by the outboard half of the right wing. The airspeed at the time of impact was estimated to be 220 mph, with a 70 degree nose/down attitude.

All six of the occupants were killed on impact.

Tragic endings to happily planned vacations by air are often the result of an unwillingness to accept realistically the limitations of light aircraft, for which weather can always be a decisive factor. IFR pilots are accustomed to selecting an alternate airport listed for their flight plan, in the event that their destination airport goes below legal minimums. The same principle could well be applied to VFR flights—not simply with regard to an alternate airport, but to an *alternate vacation plan*, in the event that bad weather generally in the vicinity of the intended holiday flight discourages the use of a given aircraft and pilot, with limited experience and qualifications. *Any trip planned in a light aircraft, even if the pilot is IFR qualified, is subject to cancellation under some weather conditions, which cannot always be foreseen far in advance.*

In planning that ill-fated flight to Atlantic City, for example, it would have made good sense either to have had an alternate means of transportation, or an alternate holiday in mind in the event that weather precluded going to New Jersey on that particular weekend. A fishing trip to some relatively nearby resort in West Virginia, reachable by car, would not have been as exciting or

as much fun as deep sea fishing, but it would have avoided accepting very serious risks to human life. Pinning all of your holiday hopes on a light aircraft that is simply not impervious to weather is like deliberately flying into a box canyon.

Another unhappy example of a pilot with an inflexible holiday plan took place in Louisiana, on a Labor Day weekend when a 53-year old oil company executive decided to fly from his home in Shreveport to spend Labor Day with relatives at Pensacola, Fla. He was not instrument rated but had over 1,000 hours in his logbook and had his own *Bonanza*. His wife, young son and the son's friend accompanied him.

They could not leave before Sunday noon and would have to return late Monday afternoon, so their time was limited, but at least it meant one last day on the beach before the reluctant return to school and work.

Before leaving home the pilot telephoned for a weather briefing from Monroe FSS (about 100 miles east of Shreveport). At 9:00 a.m. that Sunday VFR conditions prevailed all along the proposed route, including Shreveport, Monroe, Jackson (Miss.), Meridian (Miss.), McComb (Miss.), Mobile (Ala.) and Pensacola. Two hours later the pilot called Monroe FSS from the airport to recheck the weather to Pensacola. The weather briefing furnished indicated VFR conditions still existed and were forecast to remain VFR *except for showers and thundershowers*. Radar located a weak storm cell west northwest of Natchez. The pilot acknowledged the report and said that he would deviate around the storm cell if necessary. He filed a VFR flight plan, and departed at 12:22 p.m. However, the flight plan was never activated.

LABOR DAY WEEKEND ACCIDENTS
(Excluding Ag Flying and Air Carrier Accidents)

YEAR	TOTAL ACCIDENTS	FATAL ACCIDENTS	TOTAL FATALITIES	ACCIDENTS BY CERTIFICATE	FATALS BY CERTIFICATE
1973	61	3	5	STD. ..... 6 P.P. ..... 34 COM. ..... 16 ATP 5 61	STD. ..... 1 P.P. ..... 1 COM. ..... 0 ATP 1 3
1974	51	16	39	STD. ..... 6 P.P. ..... 23 COM. ..... 20 ATP ..... 1 No Lic. 1 51	STD. ..... 1 P.P. ..... 9 COM ..... 5 ATP 1 16
1975	52	10	23	STD. ..... 7 P.P. ..... 26 COM. ..... 15 ATP 4 52	STD. ..... 1 P.P. ..... 7 COM. ..... 1 ATP 1 10
TOTAL	164	29	67		

The *Bonanza* climbed to 5,500 feet, headed southeast. Radar service from the Shreveport RAPCON was terminated at 12:45 p.m. The flight path of the four vacationers would take them north of the town of Alexandria, La., located on a bend of the Red River, about 60 miles west of Natchez. At this time Alexandria FSS' local weather observation included ". . . cumulonimbus north northeast, towering cumulous all quadrants."

Apparently the *Bonanza* pilot continued his flight without checking with Alexandria FSS or any other ground facility on the progress of the reported storm cell. According to the statement of the National Transportation Safety Board official who later investigated this case, the pilot ". . . evidently attempted to penetrate what he observed to be clear areas through the cells and became disoriented in the associated turbulence. . . . The aircraft was allowed to enter a flight maneuver which exceeded the designed stress limits and the left wing separated. . . ."

At about 1:20 p.m. a witness on the ground, sitting on the front porch of his home, saw the plane tumbling out of the clouds. "I could tell one wing was missing. . . . There was a dark thunder cloud from the southwest to the northeast."

The Sheriff of La Salle Parish was summoned and the crash site located at North Jena. Four fatalities.

Attempting to fly between storm clouds in a light aircraft is a poor risk. The turbulence associated with storms frequently extends to the clear areas well beyond the cloud mass. The pilot who thinks he can slip through between the clouds may find himself caught in a vicious updraft or downdraft causing him to enter clouds and become completely disoriented. In this kind of situation it may be impossible in a light plane to maintain airspeed or altitude; all you may be able to do is control the attitude of the aircraft. Also it is possible to encounter turbulence in or near a storm cell that will literally pull the wings off the airplane.

Having an alternate plan for the weekend in mind, in the event of adverse weather, might have influenced this unfortunate pilot to respect the frightful force of the thunderclouds in view, and turn back. A small disappointment is much sooner forgotten than the loss of a family.

The Lost Engine

A tear-away powerplant creates some special landing problems

Parts Department
Globe Aircraft Co.

March 20,1946

Gentlemen:

I would like to order some parts for my Swift. Yesterday while flying I lost my engine. I did manage to land safely but the airplane will need some work before it can be flown again. Please send me everything forward of the firewall. . . .

Leonard Lockwood York, who wrote this letter, actually did rebuild his *Swift* from the firewall forward and flew it again (it is still flying today, 30 years later) is one of the few pilots who have literally lost an only engine in flight and managed to bring the airplane down safely. Engine "tear-aways," as they are called, are rare occurrences in single engine aircraft. Usually not more than one or two a year are reported. But when they do happen the pilot, unless he is prepared for the situation, may be unable to cope with the sudden shift in the center of gravity, and could experience a complete loss of control. The nose may pitch up abruptly, or the aircraft may stall and go into a nonrecoverable spin.

A number of readers have asked about the best procedure for dealing with this kind of emergency. As each make of aircraft has its own flight characteristics, it is not possible to establish a standard procedure. But in general the key factor appears to be *airspeed*. In an engineless aircraft airspeed is controlled by the elevator, and if the speed is not kept up high enough the elevator may become useless. (Elevator response is more or less directly proportional to airspeed below Mach I.) Mr. York's own account of his experience, written shortly after it happened, may be instructive. A Naval aviator in World War II, he was an experienced test pilot for Continental Engine Co. in 1946. His aircraft was a Globe *Swift*, a low-wing retractable taildragger with an 85 hp Continental fuel-injected four cylinder engine. On the day of the accident he had taken off from Muskegon, Mich., Municipal Airport at 8:52 a.m. on a flight to Cleveland:

"The engine and propeller and airplane were operating normally until I was just northwest of Amherst, Ohio (about 20 miles short of the Cleveland Airport). I was flying at 1,500 feet indicated, which was about 1,000 above the ground. The altimeter was set at 30.09 as per the Toledo altimeter setting. I had just started a turn to the left when suddenly a severe vibration began, and the engine cowling started to move up and down rapidly with a noisy thud, thud, thud. Then the thud changed tone and became less of a thud and more of a jingle.

Top—the **Swift,** barely scratched, lies in a field after York bellied it in, engineless. Lower photo—half the prop remains with the engine after it was dug from the Ohio earth.

"I recognized from the first sign of vibration that I had a propeller failure and I immediately pulled the throttle shut. The engine slowed some—but then the throttle pulled right out of the instrument panel.

"I cut the ignition switch but that did not affect the engine operation at all. The magneto ground wires had already been torn out. By this time all the push-pull controls were pumping in and out of the instrument panel at a velocity that seemed to match the engine rpm."

Shake, rattle and roll

"The vibration became extremely severe. Both ashtrays were emptied and ashes were flying over the entire inside of the airplane. All the loose articles in my pockets were shaken out and maps and everything else that was not fastened down went sailing around the cockpit. Outside I could see cowling in various-sized pieces go flying past the windows; luckily none of them struck the airplane. In spite of the vibration the flight characteristics of the airplane were pretty normal—until I was approximately 600 feet above the ground. . . .

"*And then the engine fell off!* The airplane nose came up violently and the left wing went down in what apparently was a secondary stall, resulting in a quarter snap roll to the left. I immediately shoved in full left rudder and full forward wheel. Gradually the nose came down and the airplane went into a very steep glide. Straight ahead—to the north—I could see trees to the left and a field to the right. The area around me consisted of fairly level farmland—my good luck. The field ahead, as it turned out, was plain black dirt; the crop that would be harvested there later in the year had not yet made its appearance. It would eventually—including some engine parts.

"I remember thinking that I had never heard of anyone successfully landing a single engine airplane minus the engine.

York at the controls of a Navy DC-4 in 1945, about a year before his "lost engine" incident.

(Later I was reminded that stunt pilot Paul Mantz, and also Jesse Jones, a test pilot, had done it, and I though we might form an exclusive club—we would have our meetings in a phone booth!).

"I also remember thinking about diving the airplane into the trees. In dense timber the airframe might be broken up over a sufficiently long distance of travel to absorb the shock and maybe take the accident at least out of the fatal category. I was reluctant to deliberately break up an aircraft, especially one I was fond of, but it seemed the best bet to survival.

"The airspeed was indicating about 110 mph. With the wheel full forward, the airplane remained in a steep glide, but it was under control. I found I could ease the wheel back just about an inch and still maintain flight at 110. I was trying to hang onto that 110 mph, because at that speed full down flipper (elevator) was sufficient to overcome the imbalance of trim caused by the missing weight of the engine, propeller, etc. Reducing speed below that would have resulted in a climb (followed by a loss of airspeed and stall) and a spin of uncontrollable characteristics.

"I noticed the red light on the panel, indicating that the wheels were still up. I was surprised they had not been shaken down during the severe vibration. I decided to try to put the airplane into the field gear up—rather than into the trees. I would just fly it into the ground at 110 mph, so it could decelerate without lift. I would keep the nose pushed down all the way to avoid a stall—no flare, no roundout, just bore it in.

"Keeping the wheel one inch back of full forward I got the airplane almost to the ground, but it refused to go on down, no matter how hard I pushed forward on the wheel. When the wing was about 18 inches from the ground the nose—or what was left of it—began to come up . . . very slowly. I leaned forward and waited for the tail to hit. When it did hit I leaned back and bridged into the seat belt which was snugly fastened, as is my normal practice.

"The airplane dug its nose into the ground at a fairly level attitude and at a speed of approximately 90 mph. It slid along the ground for about 150 feet, the flat firewall scooping up mud and dirt as it went along, which helped the airplane to stop. I didn't get a scratch.

"I climbed out of the airplane and looked at my watch. It was 11:28:30. From the position of the broken blade and the engine I was able to calculate later that the total time elapsed (between the first vibration and the time I stepped out of the cockpit) amounted to something less than 40 seconds.

"Some farmers came over and asked if I was all right. They said I was on a Mr. Garek's farm. I wanted to find the engine, so five of us started walking, in line, back along the flight path. In a field about seven-tenths of a mile from where the airplane stopped we found the engine, deeply buried in the ground—so deep that after it was pulled out one of the farmers jumped down inside to examine the hole and he was unable to get out unassisted, and had to be helped up. One blade of the propeller was missing."

The blade surfaces

"We could not locate the missing blade, but it was found the next day, by a high-tension line-walker for the Ohio Public Service Company, a man named Richards. He got so interested in his find that he carried it all the way back to his home, where it became a kind of showpiece for everyone in the community to see and wonder about. As soon as I heard about it I contacted Richards and got the propeller. He described the place where he had found the blade as '. . . four towers west' of where the engine fell. Since the towers are spaced 500 feet apart, that means the blade was found 2,000 feet away from the engine. The blade was found sticking vertically in the ground, tip down, imbedded down to the metal ferrule.

"I was especially interested in that propeller because it was a new design and although laboratory tests all said it was okay, I had voiced some suspicions about its compatability in the *Swift*. It didn't take long to find out I was right. Half of the wooden blade had separated from the engine, after the head of the main screw in the blade butt failed—presumably from excess vibration. After the blade flew off, three bolts in the engine mount had failed, and various tubes of the mount had sheared, allowing the engine to tear away. We never did find most of the cowling.

"But the airplane itself had little damage, other than a slight caving in of the belly from the landing. There was no damage to the wings except that the airspeed mast on the left wing was broken, along with some wing fittings. The right wing apparently had brushed the ground at some point during the landing, but so lightly I had not noticed it, and the wingtip was undamaged.

"Engine damage was just what you might expect from a 600-foot fall: fins were broken off and external parts were generally beaten up. I removed what was left of the propeller from the crankshaft and in doing so noted that clay had been driven into the back face of the key-way on the prop hub until it molded the entire rear section so that it made a cast of the rear end of the propeller actuator hub. This will give some idea of the impact involved in the drop of the engine.

"I arranged for a truck to move the wings and engine to the barn of the farmer, Mr. Garek. All of the people at the scene of the accident were very helpful and cooperative.

"Mr. Wagner, the Civil Aeronautics Administration Inspector from Cleveland who came to the accident scene, concurred that the accident was due entirely to mechanical failure and was not in any way caused by lack of care, or lack of technique by the pilot. He also complimented me on the flight job done. I have thought a lot about it since. I can think of nothing more I could have done to retain the engine in the airplane, or to land the airplane with less damage. I guess I was lucky at that."

Engine tearaways, as in the case of Lock York's *Swift,* are fortunately rare, and almost invariably the consequence of a broken propeller. Sometimes it is simply not possible to shut down an engine, following a propeller failure, in time to prevent the severe vibrations from weakening or shearing the engine mount. Preventing the cause is much easier than flying the engineless airplane, but good propeller maintenance remains one of the least understood and most neglected areas of pilot concern (see "Nick-Knocked Props" in the June issue of FAA GENERAL AVIATION NEWS).

Lock York's experience is not meant to provide data guidelines for any other pilot who might be unlucky enough to face the same frightening task. That 110 mph airspeed, for example, which proved to be just right for York's *Swift* in that particular configuration might be all wrong for another aircraft. Furthermore, you will not find that kind of information in a handbook or flight manual, because airplanes are not tested for such conditions. If the occasion should arise, you will have to work it out for yourself. York managed to do everything right because he was thoroughly familiar with his airplane and he had a solid understanding of aeronautical theory.

And also because he wasted no time (he had only about 40 seconds to impact) in giving way to panic or despair. A legacy from his years as a Naval aviator was the motto: *Never give up! Keep flying—try to retain control of the airplane, no matter what.*

Pretty good advice for any emergency.

Survival in the Sun

If you go
water is
with an

Post-crash survival, in terms of coping with the environment and one's immediate physical needs, is usually thought of as a problem encountered only by pilots who fly long distances over unsettled, unfamiliar areas—deserts, open water, mountains, etc. This is not always the case. Accidents are on record that took place literally within earshot of human habitations, following which the survivors were unable, because of injuries or weakness, to make their presence known, and suffered severely or died before rescuers could find them. In such cases the presence on board the aircraft of a minimal survival kit can spell the difference between life and death.

To sustain life in an environment made hostile by summer sun, *water* is the key survival item. This is so obvious that it is frequently overlooked by pilots who store blankets, medicine, arms, dried food, candy, etc. in the airplane. These items may or may not be helpful in an emergency, depending on circumstances, but the need for drinkable water is a certainty. No one can survive for more than a few days in a hot dry climate without it. At least a quart a day is needed to prevent dangerous dehydration. There are many skills and techniques you can learn about desert survival, but most of them involve the conservation of vital body fluids. If you live or fly anywhere near arid terrain, stocking the aircraft with canteens of fresh drinking water should be part of your preflight operation, especially in the summer.

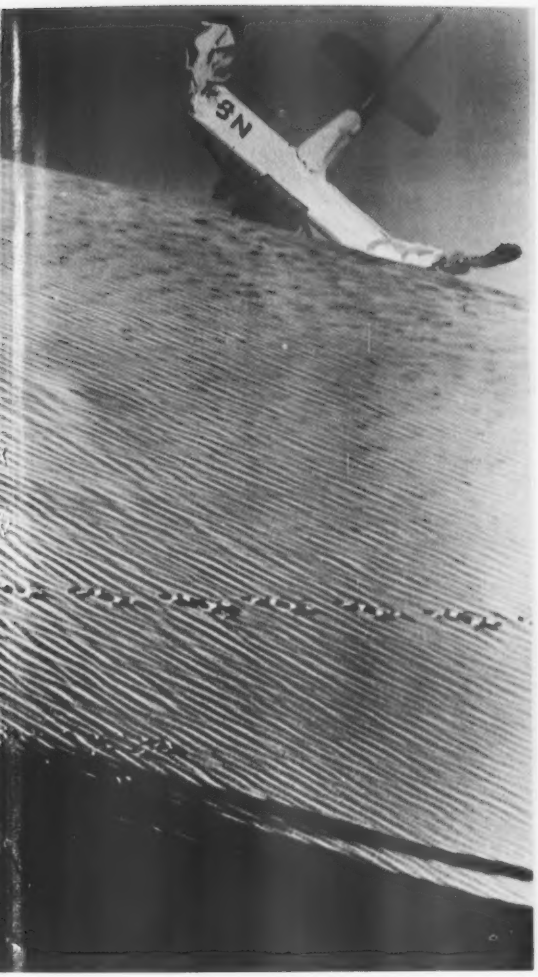
A startling example of what can happen to the pilot who takes a flight over hot barren country for granted occurred in the semi-desert area of northeastern California. A 50 year-old Mooney owner, with mining interests in the region, had flown to a small airport near Hayden Hill, about 30 miles south of Alturas, early in the week. Having completed his business by Sunday afternoon, he took off and headed west toward his home in Yreka City. It was a fine September day, perfect flying weather, and his home field was less than an hour away, over high desert country he had flown over so often that every butte and gulley seemed familiar. He did not file a flight plan, and he carried no survival equipment on board.

The pilot made a routine departure at 5:00 p.m. and climbed out to his planned cruising altitude of 10,500 feet. As he began to lean out the mixture, the engine roughened; when he enrichened the mixture the engine stopped altogether. He had taken off with the fuel selector directed to the left main tank, which indicated full; now he switched to the right, but was unable to accomplish a restart. He tried various throttle and mixture settings, to no avail. (Official findings by NTSB would later point to a misaligned fuel selector indicator plate as the probable cause of the accident; while the fuel selector was pointing to a full tank it was actually in the "off" position or on the empty aux tank.)

The ground was coming up rapidly so he called in a quick "Mayday" on the radio and set up the airplane for an emergency landing.

The brief flight path had followed a course that roughly paralleled a county road through a dried out river valley over rugged terrain strewn with boulders and gulleys. His first choice of a landing site was a straight stretch of the road. But there were enough Sunday automobile drivers out to raise the possibility of his causing a collision, so he abandoned that thought. He spotted what appeared to be a fairly level drywash, apparently within gliding range, and headed for it. The cleared area was rimmed with several tall, gaunt pine trees, and strain as he might, the pilot was not quite able to clear them. His left wing struck two trees just seven feet from the crown and shattered. The aircraft caromed off into another tree before crashing to the ground with a section of the tree imbedded in the engine and cabin. The pilot was rendered unconscious by the first impact.

When the pilot regained his senses it was already growing dark; evidently he had been unconscious for an hour or more. He awakened to find that he had a badly broken leg and a cut on his head that had been bleeding over his face. He was unable to open one eye, and in quite a bit of pain. When he tried to move, he discovered he was pinned in his seat in the cockpit. The crash impact had shoved part of the panel and the right control yoke square across the right seat, between the injured pilot and the only door. It was a discouraging situation—one that he did not feel up to facing that night, considering his injuries and throbbing head. He decided he



o down in the hot dry country, life. You can make your own, ounce of foresight.

could do nothing until morning except periodically call for help over the radio, although he was not sure whether it was working or not (negative). He did not have an emergency locator (ELT) in the aircraft.

With the onset of night the temperature on the desert plateau dropped down toward the freezing point. The injured pilot had only his lightweight flying jacket to huddle in. All that night he remained in his cramped seat, cold and in pain, alternately drifting between semi-consciousness and wakeful suffering, waiting for the light and warmth of the next day.

When morning finally came he surveyed his situation: he could not move his right leg and it felt numb, which alarmed him considerably; obviously he needed medical attention as soon as possible. He was not certain of his exact location, he had the impression a small town was quite close by, but it was clear that no one had seen him go down. His only hope of attracting attention was to get out of the airplane, and that appeared to be no simple task. Since he could not move the obstructions between himself and the door he would have to dismantle some of them—at least the righthand control yoke, impossible without tools.

As he reflected on his predicament he heard sounds which he identified as cars passing along a road. He shouted for help as loudly as he could in his weakened condition, and beat on the side of the airplane, but there was no response—he hardly expected any. As the day brightened he began to hear sounds of human activities as though some town nearby was stirring into life. The thought of being within earshot of help and unable to move was infuriating.

As he reflected on this ironic situation he remember that he did have a small tool kit in the pocket behind the front seat. It took a mighty effort, but he managed to get his hands on it, and he set about removing that control yoke wheel. It was slow work—he tired quickly and rested often—but after two hours he finally reached the point where only one nut remained. *It*, however, would not be budged. It had evidently been on a long time and was "frozen" in place with rust. Over and over he strained at it until exhausted and bloody-fingered. In between efforts he beat on the side of the airplane with his tools, and shouted, and called on the radio. Still no response. He was getting hoarse and very thirsty. He seemed to recall that there was a stray bottle of soda pop under one of the seats. He twisted his body to feel around and finally his fingers touched a can, but at first no matter how hard he tried, he could not get hold of it. Every move was a painful effort, but he kept trying, and finally he maneuvered the can into position where he could pick it up, only to learn that it was not soda at all—but a can of silicone spray lubricant.

After his first flash of disappointment, he realized the value of his find, and quickly sprayed the frozen nut with the lubricant. After a short wait, he set the wrench on the nut again and felt it loosen. He soon had the wheel off, which enabled him to bend the seat forward far enough to allow him to crawl behind it, squeeze out the door and move onto the wing. He was concerned about further injuring his broken leg, and tried to support it with his belt as he moved.

It was now late Monday afternoon: it had taken him nearly the whole day just to emerge from the airplane. He was certain that he had been missed by this time and that a search had been launched; he had heard, with great excitement, several planes fly over during the day, but the engine sounds remained faint and soon died away; perhaps they had failed to spot him. He saw that he was in a partially wooded area, with no sign of life or human habitation around. He was certain that he was not far from a road and a town—but which direction?

The weary pilot was determined to do something to help himself be found, but even negotiating the two feet drop from the wing to the ground was a serious problem for the injured man. When he found it impossible to slide off slowly, he simply let himself fall

Expected Survival Time in the Desert

NO WALKING AT ALL	AVAILABLE WATER PER MAN, U.S. QUARTS					
MAXIMUM DAILY TEMPERATURE (°F) IN SHADE	0	1 Qt	2 Qts	4 Qts	10 Qts	20 Qts
	DAYS OF EXPECTED SURVIVAL					
120°	2	2	2	2.5	3	4.5
110	3	3	3.5	4	5	7
100	5	5.5	6	7	9.5	13.5
90	7	8	9	10.5	15	23
80	9	10	11	13	19	29
70	10	11	12	14	20.5	32
60	10	11	12	14	21	32
50	10	11	12	14.5	21	32

WALKING AT NIGHT UNTIL EXHAUSTED AND RESTING THEREAFTER	AVAILABLE WATER PER MAN, U.S. QUARTS					
MAXIMUM DAILY TEMPERATURE (°F) IN SHADE	0	1 Qt	2 Qts	4 Qts	10 Qts	20 Qts
	DAYS OF EXPECTED SURVIVAL					
120°	1	2	2	2.5	3	
110	2	2	2.5	3	3.5	
100	3	3.5	3.5	4.5	5.5	
90	5	5.5	5.5	6.5	8	
80	7	7.5	8	9.5	11.5	
70	7.5	8	9	10.5	13.5	
60	8	8.5	9	11	14	
50	8	8.5	9	11	14	

off. The impact was so painful that he passed out again.

When he recovered consciousness, another night was setting in, and he realized that his chances of being found in the dark were almost nil. He was totally unable to rise to his feet, so he slithered along the ground, propelling himself with his forearms slowly and painfully, resting every few feet until he was far enough away from the airplane to feel safe in starting a fire. His pockets had yielded a total of two matches. He gathered dry twigs into a pile.

Using punk from a rotted log, and great care, he succeeded with the first match. The fire flared up so rapidly, in fact, that moments later it was threatening to spread to the airplane and he had to beat it down with his jacket. This meant abandoning the hope of rescue that night, but he was too weary to mind the fire and too worried about the plane blowing up to leave it unattended. He was determined to push on early in the morning, because over the top of the hill he could see what appeared to be the peaked roof of a cabin, and he had hopes of finding help there. He fell asleep under the trees in a skimpy shelter improvised from leaves, tree limbs and grass.

Next morning he resumed his tedious travel, now even more slowly, as the hilly terrain prevented his moving in a straight line. A new problem was the effect of the sun. In his dehydrated condition he found that even a few minute's exposure to full sunlight literally knocked him out, and so he had to travel around any clearing and stick to the more difficult wooded areas.

The top of the hill, where he hoped to reach the end of his ordeal, offered a crushing disillusionment. The "cabin" he had been seeking turned out to be only two tall, oblique dead trees, leaning against each other in cathedral-like silhouette. Nowhere was there a sign of human life.

He realized he could scarcely hope to reach the town wherever it might be, and that his best chance for survival, admittedly poor, was with the airplane, so he started back. Along the way he found a few prickly pears, which he peeled and chewed; they helped a little. By nightfall he was back at the airplane and he managed, finally, to retrieve his overnight case from the luggage area. Inside there were some aspirins to ease his pain and some tooth paste, which he used to moisten his lips. The only liquid he found in the airplane was wax, and he even took a swallow, experimentally, but had to spit it out. Rescue, he concluded, was out of his hands. He set up a shelter under the airplane wing and bedded down there, feeling increasingly weak and more dehydrated.

Search and rescue efforts had been delayed nearly 36 hours, owing to uncertainty as to the missing pilot's intentions. When he failed to show up for supper Sunday night, his wife had telephoned his business associates in Hayden Hill. The latter speculated that her husband had gone to Alturas, where he mentioned having some matters to settle, and would probably spend the night there. It was only after a second night had passed without word from him that FAA's Air Traffic Service was alerted and a search was officially initiated.

Over the next three days dozens of search flights were conducted by volunteers and sheriff's helicopters. But since the pilot had reportedly flown toward Alturas the search was largely confined to the area northeast of Hayden Hill, which includes vast Wilderness Areas covering thousands of acres of extremely rough country. If a pilot actually did go down in this area and had no means of signalling rescuers or indicating the approximate crash site, it could be weeks, or months, or even *years* before he could be found.

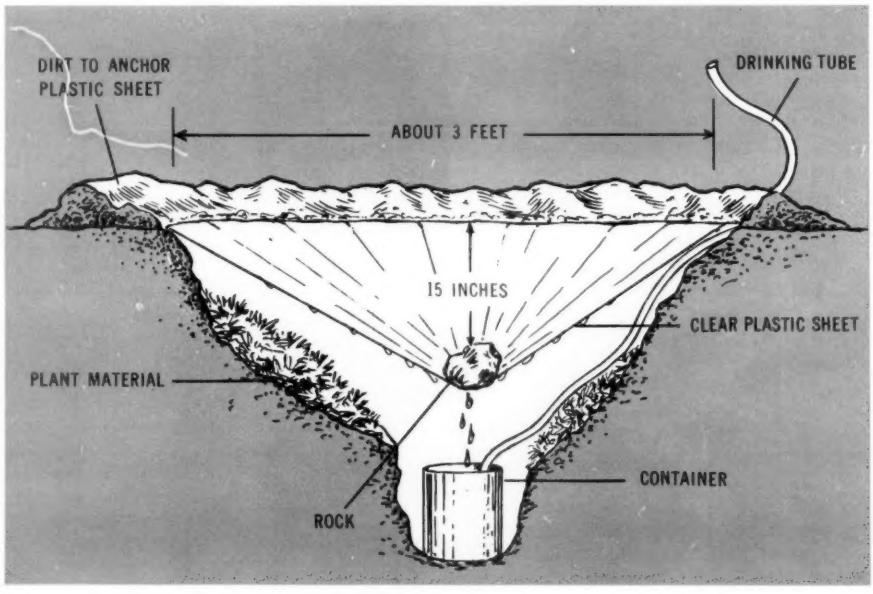
But of course the pilot was not there at all—he had gone down some 30 miles *northwest* of Hayden Hill. During these three days he huddled in the shadow of his wrecked airplane, scarcely moving, conserving his strength and chewing on whatever prickly pears he could find close at hand, his eyes and ears scanning for the rescue from the sky which was never to come.

By Thursday night he was so weakened and dehydrated that he was convinced that he would not live through another day, and he decided to make a last-ditch effort to attract help. In the morning he would gather up whatever he could find in the way of clothes and rags, fasten them to his belt and drag them out into a clearing. There he would lay out a big "X" and hope that it would be seen from the air. He realized that exposing himself to that much sun might well bring on a final state of unconsciousness—he was having intermittent blackouts most of the time—but it seemed his only chance. He hoped he could manage to struggle as far as the clearing. In his weakened condition a hundred yards seemed like a hundred miles.

Soon after daybreak on Friday morning he began, slowly and painfully, putting together whatever suitable material for the signal that he could find. He was only barely conscious, and when he heard an engine and caught sight of a pickup truck glinting through the trees he was not sure whether it was real or an illusion; but he banged on the airplane wing with all of his remaining strength. The appearance of two high school boys approaching with startled faces was the most welcome sight of the pilot's life. The youths, who had played hooky from school that morning to get in a little pre-season rifle target practice, drove back into town—less than a mile distance—to notify the Sheriff, who quickly arrived on the scene together with an ambulance.

A month later the pilot emerged from the hospital, but his ordeal was not quite over. He has had three operations on his leg to date, and he will need several more, to repair the shattered knee, before he can regain much use of the limb. He knows that he was fortunate to have survived at all and that he contributed to his near demise by failing to file a flight plan or to notify anyone of that intended flight. He also contributed to his own survival by the courage and stamina he displayed in those five days of pain and despair. He does not know

THE SOLAR STILL. An ounce of clear plastic sheeting (at least six feet square) can produce a dozen ounces of water per day. When the sheet is suspended in the shape of a cone over a hole in the ground, the trapped, heated air draws moisture from its immediate environment. The moisture condenses on the lower side of the plastic and trickles down from the point of the cone. Vegetation matter added to pit helps condensation.



The edge of the Mojave where temperatures over 115 degrees are not uncommon.

whether he will ever be able to fly again, but if he does you can bet that he will have water stored on board the airplane, and a survival kit at hand. He knows, the hard way, that no pilot is immune to misfortune, and in the wilderness only the prepared are likely to survive.

The irony of this accident—in that the pilot was never more than a mile from a town and a road, but was just as helpless as a man lost in a vast desert—points up the unpredictable nature of aircraft accidents. Conditions are never exactly the same, but a basic knowledge of self-help procedures will increase your chances for survival in the sun.

It is important, first of all, to understand the limits of your own body. In hot, dry climates you might lose a *gallon* of water a day—even more if you are active and perspiring. If you have never experienced the fierce heat of the summer desert you can scarcely imagine how debilitating it can be. You must have water within a day or two at most to survive. A truck driver who recently left his stalled truck on the Arizona desert to seek help was found dead of heat exhaustion only a day later.

These are good reasons for staying close to the airplane if you go down on inhospitable terrain. Battered as it may be, the plane may afford the only shelter from the sun for miles around. And unless you are certain about your location you could exhaust and dehydrate yourself in a few hours by wandering around in the open. A sad case in point involved a 20-year old student pilot who took off one day in May for his first solo flight, San Diego to El Centro, Calif. He apparently got off course, missed his destination and continued to fly until he ran out of fuel. He landed the aircraft intact on a deserted mesa near San Rosario, Mexico. Mistakenly believing that he was near the Salton Sea in southeastern California, he left a note stating that he was going to "walk to the shore ten miles away and turn north." When he found only barren cliffs before him, he struggled back to the airplane and left a second note declaring his intention to walk due north. He had no water. The pilot was found ten days later by a rescue team, dead of exposure.

The temperature in the desert varies tremendously in the course of 24 hours, ranging from as high as 115°F. at midday to as low as near freezing at night. Consequently your best bet to conserve moisture, if you must move on, is to travel after sundown. Desert skies are usually pretty well illuminated at night by moonlight or stars, and you can set your course by the latter. On the same water ration you can travel twice as far on foot by night as by day. It is important not to give way to panic, if you should find yourself surrounded by apparently countless miles of uninhabited desert, to imagine that you will die of thirst or hunger unless you push off at once in search of help. The very heat of the sun can be used to provide water, if you have only the few materials needed for a solar still; and if you have water you can survive without food for weeks.

Building a solar still requires only a piece of clear plastic, a cup or can to catch the water, and a piece of flexible tubing (see diagram). Such a still can also be used to help clarify water that may not appear suitable for drinking. Water purification tablets or a few drops of iodine per gallon will help render it safe.

If you are left with no equipment at all but your bare hands, you can still obtain water in the desert under some conditions, if you know where to look. Dig at the base of the greenest plant you can find; water may slowly seep into the hole. You can also try digging in dry stream beds. If the sand several feet down appears even slightly damp, keep on digging; there is water below.

To help conserve what water you have, it is important to avoid exposing any part of your body to direct sunlight. Find or make a shelter to hole up in during the day, and if you must venture out before night, make some kind of hat out of newspaper or cloth. You should understand that smoking or alcohol in any form are dehydrating. Salt should not be taken when water is short.

Food is usually not a serious problem for the traveler down in the desert. In fact many experts on the subject recommend that if water is short you should eat little or nothing—especially not meats or fat, which require water for the process of digestion. Unless water is plentiful the exertion required to pursue game of any kind may not be worth the attendent loss of body moisture. Dehydration has a much more immediate and serious effect on available energy than fasting; most of us have enough stored energy in the form of body fat to supply us for two or three weeks.

Second only to the conservation of moisture in importance to your survival in the desert is an effective signal. A solitary individual on the desert can be as inconspicuous as a grain of sand. Transmit your radio (and your ELT) as long as they have life, which should be at least 48 hours, unless they were damaged in the landing. (Remember to cut the master switch to conserve battery power.)

Fire is usually your best ally for attracting attention visually. Unless your downed plane burned, gasoline should be available. Even if fuel exhaustion was your problem there will be some "unusable" gas left in the system, which can be got at. Pile up deadwood if it is available; otherwise fill a container with sand and soak it with gasoline. Adding oil or rubber to the fire produces a dense smoke which is more discernible by day than the fire itself. At night a clean flame gives the brightest illumination. Mirrors of glass, metal or foil are effective in bright sun. If you can do nothing better, make a *sign* of stones, aircraft parts, or a trench. If you cannot recall the standard symbols, write HELP, or SOS or make a big X. Remember that a plane may go by when you are asleep, or passed out.

For those who expect to fly over or near desert-like country, the FAA pamphlet, "Tips on Desert Flying" is an excellent collection of useful information. The publication is available free from FAA District Offices in the Western Region (California, Nevada, Arizona). Commercial suppliers of survival items also publish useful brochures on this subject, and the Aircraft Owners and Pilots Association offers periodic field courses on wilderness survival.

Whatever it takes, become a believer. The sun could be your undoing.

(Editor's note: A number of details concerning the above accident have been altered in order to preserve the anonymity of the persons involved.)

BASIC DESERT SURVIVAL KIT

General

- Aluminum foil—for catching water
- Candle—to conserve matches
- Candy, hard
- Canteens of water
- Mirror—for signalling
- Matches—a dozen wood matches, strike anywhere if available
- Plastic bags—to carry water
- Plastic sheet—for shelter, for solar still
- Pocket knife—best quality
- Sunglasses
- Sun hat
- Whistle—Police or 'thunderer" type

First Aid

- Antiseptic ointment
- Aspirin, antibiotics
- Bandages, bandaids, adhesive tape
- Iodine
- Water purification tablets

Famous
Flights

Piper's Sky Flivver

The longest slow flight in history made the airplane famous but not the pilots

The takeoff of the J-3 Piper **Cub** was accomplished easily in 17 seconds, which was an immediate relief to the young pilot at the controls, because the yellow fabric-covered airplane was some 300 pounds over gross maximum weight.

The place was Newark Airport; the date: May 17, 1938. And the overload was caused by the extra fuel on board, more than four times the amount usually carried on the **Cub,** which was out to set a new world record for endurance as well as distance.

The flight plan called for the **Cub** to fly from Newark to Miami and back again, **nonstop!** A 2,420 mile flight without ever touching down, in an airplane originally designed for a maximum of 200 miles. Refueling would be accomplished by hoisting cans of fuel on board at predesignated sites along the route. The first refueling location was at Raleigh, N.C., some 444 miles south of Newark.

Estimated flying time, six hours. Flight tests with the overloaded **Cub** led the pilot to expect a normal cruising speed of 74 mph. With that speed and the good weather forecast, the pilot estimated he could accomplish the round trip in about 40 hours. That would be enough to establish a new dual record.

But, as pilots before and after have discovered, the weather is no respecter of the best laid plans of mice or men. The pilot was to encounter strong head winds, dense fog, and poor visibility. The unusual "flight of the flivver," was to take considerably longer than originally planned.

The pilot in the front seat, 23 year old Kenneth Kress, was one of those youths born to fly. A decade earlier he would have been competing with Lindbergh for Trans-Atlantic honors. Despite his age, he was already a seasoned pilot, whom the Piper family of aircraft builders had given a mission that could well determine the rise or fall of the company.

Ken Kress had been born in Lock Haven, Pa., in 1914 and he began flying in his early teens. He was 11 years old when he saw his first airplane, an OX-5 Curtiss **Travel-Aire** which had come to town, and he eventually got to fly that airplane by hanging around the strip, doing odd jobs such as cleaning the airplane, helping to fuel it, cutting the grass, etc. By the time he was 17 he had enough flying experience to obtain a job as a pilot for Bald Eagle Aviation in Williamsport. Two years later, when he had logged some 1,500 hours, he signed on as a test pilot with Piper's predecessor, Taylor Aircraft Company, in Bradford.

When Piper took over Taylor Aircraft and relocated in Lock Haven, Kress soon advanced to the job of chief test pilot. In his first two years with Piper he test-flew over 1,200 **Cubs,** sometimes as many as five a day, taking them up to 3,000 feet and putting them through a series of dives and pull-outs. By 1938 he had logged more than 2,000 hours in **Cubs** alone, and had obtained an Airline Transport rating and a mechanic's Airframe and Powerplant rating.

The idea for the Newark-Miami flight was conceived by Piper executives as a demonstration of the durability of a **Cub,** which they sought to popularize as the new "flivver of the air," a counterpart of the famous Ford product. But the project could easily back fire if the flight was a dismal failure.

After studying the proposal and looking at existing records, Kress accepted the challenge. In 1938, the National Aeronautical Association listed the distance record for light planes as 700 miles, the endurance mark as 36 hours. Ken Kress felt he could beat both those records in the one flight.

He supervised the modification of the J-3 for the flight. First of all, the usual 40 hp Continental engine was replaced with a larger 50 hp Lenape **Papoose.** A larger fuel capacity was designed. In addition to the regular 9 gallon tank, another 24 gallon belly tank was added, plus an extra 5 gallon can in the cockpit. Not much special instrumentation would be added: a one-way radio, capable of receiving only, a 200 hour battery, and a Kollsman sensitive altimeter.

For his copilot, who would ride in the seat behind him, Ken selected another young man, his assistant at Piper, Glen Englert. With two pilots and the added equipment the **Cub** weighed 1,324 pounds, instead of the listed maximum gross weight of 1,000 pounds.

Once airborne toward Miami, the **Cub** began to experience strong headwinds, and it was almost noon before the pilots reached Raleigh Airport for the first fuel pick-up. The plan was for an automobile to drive down the runway at 50 mph while Kress brought the **Cub** down to about 15 feet above it and closed the throttle until he was going at the exact same speed. Englert meanwhile was dangling a rope out of the **Cub** with a hook attached to the end. A man strapped to the front of the sedan held a 5 gallon can of fuel; he was expected to grasp the dangling rope, attach the can, and allow Englert to pull it up into the cabin.

On the first passes the airplane and the automobile failed to synchronize; it took 14 passes to pick up the 6 cans of fuel. By 1:00 p.m. Tuesday they had finally finished fueling at Raleigh, and Kress turned south for the next leg, 397 miles to Jacksonville. Englert inserted the fuel in the tanks by a special fuel line they had leading into the cabin.

Before takeoff the **Cub** is dwarfed by an airliner as Kress, left, and Englert discuss the route with Eastern Captain Albert Duke.

The **Cub** was still running into strong headwinds, and it was dark before they reached Jacksonville, with 10 minutes of fuel remaining. By the time they had lifted more fuel in the north Florida city it was 12:20 a.m. on Wednesday.

Leaving Jacksonville, they headed south again for the 396 mile flight to Miami. Over central Florida they ran into fog and rain and some smoke from a forest fire. Visibility became practically zero and for almost three hours Kress was flying blind over the Florida swamps with only his compass and altimeter to guide him.

At 3:15 a.m., he finally saw the lights of Orlando below him. He now realized that he did not have enough fuel left on board to reach Miami, so he headed back to Jacksonville. He arrived at dawn, buzzed the field to activate a fuel transfusion and then turned south again. Wednesday morning was clear, and the flight to Miami was smooth. The two pilots took alternate and fitful catnaps in their seats

At Miami the gas cans were handed up to the low flying plane from the back of an open roadster; in seven passes they picked up 20 gallons of fuel. They also hauled up some sandwiches and coffee to supplement the candy bars they snacked on.

The **Cub** descended for a third fuel pick-up at Jacksonville after nightfall. Making his first pass, Ken ran a wheel through a tree branch at the end of the runway, scraping his wheel cover. It was too close for comfort. Kress took the **Cub** up a few thousand feet and circled until dawn, when he came down for more fuel.

The trip through the Carolinas was made in such heavy fog that Kress had to bring the **Cub** down under 100 feet. They reached Raleigh about noon, took on 35 more gallons

of fuel, and almost terminated the nonstop flight when the fuel handler on the ground jerked the rope too strenuously, causing the slow flying **Cub** to lose the scant 15 feet of altitude it had. Kress bounced the wheels on the runway and got it up again for another go-around.

He also dropped a message, saying that an extra fuel pick-up might be necessary at Baltimore, which he expected to reach at about 6:30 that evening; a crew was positioned there, but when the small **Cub** had not shown up by 7:30 p.m. it was feared the plane might have crashed. Actually, Kress was making such good time that he decided to fly straight on to Newark, where he arrived at 8:00 p.m. Everyone was still expecting him at Baltimore; there were no floodlights on at Newark, and Kress was not quite sure where the airport was.

Finally, he recognized an illuminated distillery building near Route 1, and he was able to get his bearings. The airport lights went on for a short while as an airliner landed, but they went right off. Approaching to land, Ken blinked his navigation lights, but no ground lights responded. Worn out and anxious to get down, Kress landed in the dark. After logging in their arrival, the two pilots immediately went to bed for 13 solid hours of sleep.

The **Cub** had been in the air for 63 hours and 54 minutes, and had traveled a route distance of 2,420 miles. Total gross distance, including the circling and the flight back to Jacksonville, was probably better than 3,500 miles. The poor weather they encountered had reduced their average speed to less than 40 mph, and at no time did they ever fly higher than 4,000 feet. But they proved that it was possible to visit Miami from the New York area in a Piper **Cub** and return without touching the ground.

It was not an earth-shaking achievement, but it did give the light plane industry a much needed boost. The **Cub** did not quite match the popularity of the Ford flivver but it soon became a household word and before the year was out Piper was building more aircraft than anyone else in the world.

As for the two pilots, they each received a pat on the back and a "well done!" The only extra remuneration Ken picked up was $50 for endorsing a brand of corn flakes, which he found as palatable as the money was welcome. He moved on from Piper to become an inspector for the Civil Aeronautics Administration, and is presently chief of FAA's Baltimore Flight Standards District Office. The excitement of that wild flight to Miami on fuel snatched from the ground, although it did not lead to fame or fortune has remained with him all of his life.

Decades after that record-breaking 64-hour flight Ken Kress, now Baltimore GADO chief, still admires the doughty little **Cub**.

BRIEFS

WATCH OUT! Additional eyes in the cabin of a small plane are always desirable, in theory, for looking out for aircraft, but untrained observors can create a dangerous confusion. Incidents have been noted where a panicky cry of "Watch out" at a critical point in a maneuver nearly resulted in an accident. When briefing first-time air travelers it may be a good idea to instruct them in a predetermined method of visual assistance, such as a tap on the shoulder and a pointed finger, accompanied by the word "airplane."

■ GETTING ON THE NPRM LIST. To encourage increased public participation in rulemaking, FAA has issued a publication explaining how the process works and also how to receive Notices of Proposed Rule Making (NPRMs). Ask for "Notice of Proposed Rulemaking Distribution System" (AC 11-2).

FUTURE FIXERS NOTE: Aspiring aircraft mechanics will be interested in the "FAA Designated Mechanic Examiners Directory" which has recently been updated. These designees are authorized to give oral and practical tests for mechanic certificates for Airframe ratings, Powerplant ratings, or both. (Directory is coded to show ratings of each designee.) The publication is listed as AC 183-30B.

ATTENTION MATCH COLLECTORS: Air travelers on air carriers or general aviation airplanes are advised to use extreme caution in carrying book matches in their luggage. The often-used term "safety matches" has proved to be a misnomer in several recent instances where the matches in one book have contacted the striking strip of another book, and the matches ignited inside the airplane luggage. In one instance an explosion resulted when the smoldering fire ignited the contents of a can of hair spray (luckily the suitcase was not on board an airplane at the time.)

Carrying loose book matches is not only dangerous but it may also be illegal; Federal Regulations (Title 49 CFR Part 175), which has replaced FAR Part 103, classifies matches as hazardous because the heads are a "flammable solid." Matches can be legally carried on aircraft only when completely packed in a tightly closed container. Penalty for violation of the regulation could be a fine up to $10,000 (or $25,000 and/or five years in prison if criminal intent can be proved).

MORE ON AIRMARKING: A reply to a letter in the June 1976 Flight Forum column implied erroneously that it is generally acceptable to paint names on airport runways and taxiways. Actually, FAA regulations require that only standard markings (as defined in AC 150/5340-ID) be placed on runways designated for instrument use, or on any paved area at an airport receiving Federally obligated funds. In the interest of air safety, it would also be advisable to consult with Flight Standards District Offices with regard to any proposed airmarking.

Unless otherwise noted, all publications mentioned in the column are available free from the DOT/FAA Publications Section, TAD 443.1, Washington, D.C. 20590.

AC Explains Requirements for Air Show Waivers

Potential sponsors of air shows, as well as pilot participants, will be interested in a new FAA Advisory Circular which explains the kinds of Flight Standards waivers required for special flight maneuvers and the procedures for obtaining the waivers.

The policy of FAA is to issue waivers to accommodate the desires of show sponsors while at the same time assuring that spectator and public safety will not be jeopardized. The policy is summed up in the statement: "Anytime, anywhere, anyone can stage a safe airshow, FAA will issue an appropriate waiver."

Questions that must be considered by airshow sponsors early in the planning stage include the following: *What type show, and aircraft, will there be—everything from slow, small airplanes to military jets? Will the performers be local flyers or professional airshow pilots? Will the site be an airport, fairground, or other? Will it provide a standard lateral separation between performing aircraft and the crowds? (1500 feet for aircraft with cruise speeds above 180 mph; 500 feet for slower airplanes.) Will policing be done by volunteers or law enforcement officers? Are there existing barriers and fences?*

Can adequate arrangements be made to control air and ground traffic before, during and after the show? Are existing emergency, first-aid and fire fighting equipment sufficient, and if not, what supplementary facilities are planned?

These and other items are covered in the airshow waiver application (Form #7711-2), available from the FAA Flight Standards/General Aviation District Office, which can also help in answering the questions.

When issued, the airshow waiver will contain a list of special provisions to ensure safety and an FAA designated monitor will be named.

Copies of "Airshow Waivers" (AC 91-45) are available free from the FAA/DOT Distribution Unit, TAD 443.1, Washington, D.C. 20591.

Beech Offering Owners Standardized Handbooks

Beech Aircraft Corporation is in the process of mailing all registered *Bonanza* owners free copies of a newly designed "Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual." The book, which has ten sections arranged for quick reference, meets the recently published specifications of the General Aviation Manufacturer's Association for operating handbooks.

Bonanza owners who have not heard from Beech should contact their nearest Beech dealer for copies of the handbook.

The manufacturer has advised FAA that the new book will replace several existing Beech publications, including the "Owner's Manual" and the "Airplane Flight Manual," and will become the official document which must be kept in the airplane and must be followed by the operator.

Certain other manufacturers are offering similar books with new aircraft—and most will do so in the future—but Beech is the first company to provide such books for older models. Six books, covering eight models (35-G, -H, -J, -K/M, -N/P, and -S) have been distributed so far, and those for other *Bonanza* models will be issued within the next few months. Similiar books for other Beech aircraft (*Baron, King Air, Queen Air, Sundowner, Sierra,* etc.) are scheduled to follow.

FCC Proposes Frequency Changes

The Federal Communication Commission is proposing to reassign certain frequencies to help reduce congestion on UNICOM. The proposed rule would add two primary frequencies (those with one digit after the decimal point) to the one (122.8) now used for UNICOM at uncontrolled airports. About 2,100 UNICOM stations that are now using a single channel would have available a total of three primary frequencies. On request, 122.75 would also be assigned for UNICOM at an uncontrolled field.

The newly assigned UNICOM frequencies would be 122.7 (to be taken from FSS use) and 123.0 (now used for UNICOM at airports with towers or FSS). UNICOM at the latter sites would use 122.95.

The primary frequency for use in air to air communications, and such special use as agricultural operations, parachute jumping, etc., known as MULTICOM, would continue to be 122.9. However, 122.85 would be added for this use.

Although 25 kHz frequencies would also be assigned, for the most part they would be reserved for future use. Under the proposal the 50 kHz channel assignments would be as follows:

122.7	UNICOM at uncontrolled airports
122.75	UNICOM at uncontrolled airports (on request or for future use)
122.8	UNICOM at uncontrolled airports
122.85	MULTICOM
122.9	MULTICOM
122.95	UNICOM at tower or FSS airports
123.0	UNICOM at uncontrolled airports
123.05	UNICOM at heliports

Comments on these proposals (FCC requests 12 copies) should be sent by August 31, 1976, to Docket #20123, FCC, Washington, D.C. 20554. (Note that FCC, *not FAA* establishes rules governing non-government frequency assignments.) Government frequency assignments are under jurisdiction of the Office of Telecommunication Policy (OTP).

Strobe Wiring Caution Circulated

A notice has been issued by FAA alerting field personnel and the public to the potential danger that can exist when wiring for wingtip strobe lights is routed through the fuel tanks. The conduit housing the strobe light wiring can be damaged by fuel nozzles, allowing the fuel to contact the wiring. Several tip-tank explosions have occurred after fuel vapors were ignited by a malfunctioning strobe that was mounted in the tiptank structure.

Operators of aircraft with wingtip strobes are encouraged to see that the system is inspected for deficiencies (explosion-proof flashlight should be used). Maintenance and service personnel should keep the problem in mind during servicing and maintenance.

• Beachey and the Bridge

As a Curtiss-Pusher owner, I cringe every time I see that famous Library of Congress photo of Beachey flying under the Niagara Falls bridge. That photo of America's first stunt pilot is so badly retouched it should be called a painting instead of a photo!

Among the most glaring errors are that the plane is going to pass to the right of the camera (ailerons are going to the left); the plane is above camera and climbing (you can see under the wings) but the front wheel has been painted in so low that the plane appears to be flying down to the camera; the photo shows two different elevators, and rudder offset from center; the picture abounds with rods, struts and wires unknown to Curtiss.

Please—for posterity's sake—print the enclosed good Curtiss-Pusher photograph so readers can see the errors themselves.

E. D. "Hud" Weeks
Des Moines, Iowa

• How To Change Your Name

I was recently married. When I wrote the FAA Record Center in Oklahoma City to have my name changed on my pilot certificate they replied that I had to send my marriage license and my old pilot certificate, and they would send me a corrected one. Is this a rule? If so, what do I do in the meantime? I would prefer not to part with my new marriage license, and even more importantly, won't I be illegal flying without my pilot certificate? I don't want to be grounded for an uncertain period of time while the paperwork is accomplished.

Mary Grove Wilson
Chicago, Ill.

FAR 61.25 does make this requirement, but there is a simple way to accomplish the name-change. Take your two certificates (marriage and pilot) to your FAA District Office (GADO or FSDO) and fill out an application for a corrected certificate. They will take your airman certificate and give you a temporary one to use until you get your new one. They will examine your marriage license (a copy will do) and return it to you.

• Surplus Warbirds

I am interested in military aircraft of World War II. Would you know where I may inquire as to purchasing surplus aircraft, in non-operative conditions, to be used for decorative purpose?

Ralph Vollono
New York, N.Y.

Advance information on upcoming sales is available from the Defense Surplus Sales Office, Dept. RK-24, P.O. Box 1370, Battle Creek, Mich. 49016. This office maintains a master list of all persons interested in bidding on surplus material, including their geographical location and particular interests and provides them with an invitation to bid on appropriate offerings in their area. The invitation includes details on terms of sale, location of property, description, quantity, dates of inspection, time and date of bid opening, removal of property, etc.

Prospective purchasers of military aircraft who are interested in flying them are cautioned to check their "potential for certification." It is sometimes difficult and expensive to get such aircraft certified for civilian use.

• Still More VASIs

In your April Forum you mention the "three-board" VASI. It is truly amazing how things keep coming back to life. Way back in 1961 the New Hampshire Aeronautics Commission conducted a test program on this type of VASI, only then it was called a "POMOLA" and I believe the Navy had a hand in its initial development.

The system consisted of three boards painted chrome yellow with a horizontal black band on each board. The back panel was set lower than the two front panels to produce a visual "glide angle." When the pilot lined up all three black bands evenly and kept them so aligned he would then descend along the predetermined path to touch down. It seemed to work quite well until the wind, sun, snow storms and vandals drove us up a wall and the project was abandoned.

Some of the pilots of New Hampshire will remember we had them at Rochester Skyhaven Airport and at Hampton Airport. I helped install these early VASIs, and would be glad to assist those who are involved in the study.

Gordon Bunker
New Hampshire Aeronautics Commission

Your letter has been passed on to the Systems Research and Development people who are presently evaluating the VASIs for FAA.

• Roscoe Turner Also Won

A correction should be made to Jack Wichels' letter in the March Forum regarding Jimmy Doolittle as the only winner of both the Bendix and Thompson Trophies. Not so—Roscoe Turner won the Bendix in '33 and the Thompson in '34, '38 and '39. He was one of the most consistent participants in these races and had a couple of other near firsts also. Best wishes.

Glenn Buffington
Seattle, Wash.

Mr. Wichels' letter, as we read it, was intended to mean that Doolittle was the only pilot to win the Bendix and Thompson Trophies in addition to the Schneider Trophy.

• Mexico Weather

While I am not a pilot, I read each issue of General Aviation News from cover to cover. Referring to your article, "Flying South of the Border," please note that Mexican weather reports differ from those in this country. The order of elements may vary somewhat from ours, and more importantly, the temperature and dewpoint are in Celsius, not Fahrenheit.

Leon H. Turk
Kansas City, Mo.

All measurements in Mexico, as noted in our article, are in the metric system.

A FSS near the border can familiarize you with the Mexican weather sequence report, which does follow a unique order.

• Low Lead and High Compression

My airplane has a Continental IO-470 engine which was made long before the current energy crisis and lead-content battles. The manual states that a minimum of 100/130 aviation grade gasoline shall be used. I believe this has a minimum of 4.6 ml of lead per gallon. Most places now have the 100 LL gas which has about 2 ml of lead per gallon. I assume the octane rating is the same. Can I use this 100 LL avgas in my plane? I am, of course, worrying about detonation which is very difficult to detect in airplanes because of the noise level in the cockpit. Is there some means of detecting knocking without waiting for the rather slow indications of temperature rise in the exhaust gas temperature or cylinder head temperature?

Name withheld
Jenkintown, Pa.

Engine authorities (including those from the manufacturer of your engine) generally agree that not only is Grade 100 LL (low lead) acceptable in engines that were built for the old high lead 100 octane, but it may even be better since there will be less accumulation of lead in the engine.

It is difficult for the pilot to identify detonation unless it is heavy, since there may not be noticeable symptoms such as roughness, temperature increase, or loss of power. Your engine mechanic, however, will be able to pick up clues when he examines the engine. Incidentally, piston engines are most vulnerable to detonation when operating at high power settings, when temperatures are higher. Excessive leaning at high power is another principal cause of detonation.

INSTRUMENT CORNER

• SDF Approach

Fond du Lac County Airport, Wisconsin, has a SDF approach on runway 36. I have not been able to find out much about the SDF. What does SDF stand for, and how does it differ from a localizer or VOR?

Harold A. Venselow
Wauwatosa, Wisc.

The Simplified Directional Facility (SDF) is described in Part I of the Airman's Information Manual. It is similar to the localizer except that the SDF antenna may be offset from the runway centerline. The angle between the final approach course and the runway (generally not more than three degrees) is indicated on the instrument approach chart. The SDF, which operates on frequencies from 108.10 to 111.95 MHz, is a non-precision approach, since it provides no glide-slope information. Making an SDF approach is much like executing a standard no-glide-slope localizer approach, except that the SDF course may not be aligned with the runway and the course may be wider, resulting in less precision.

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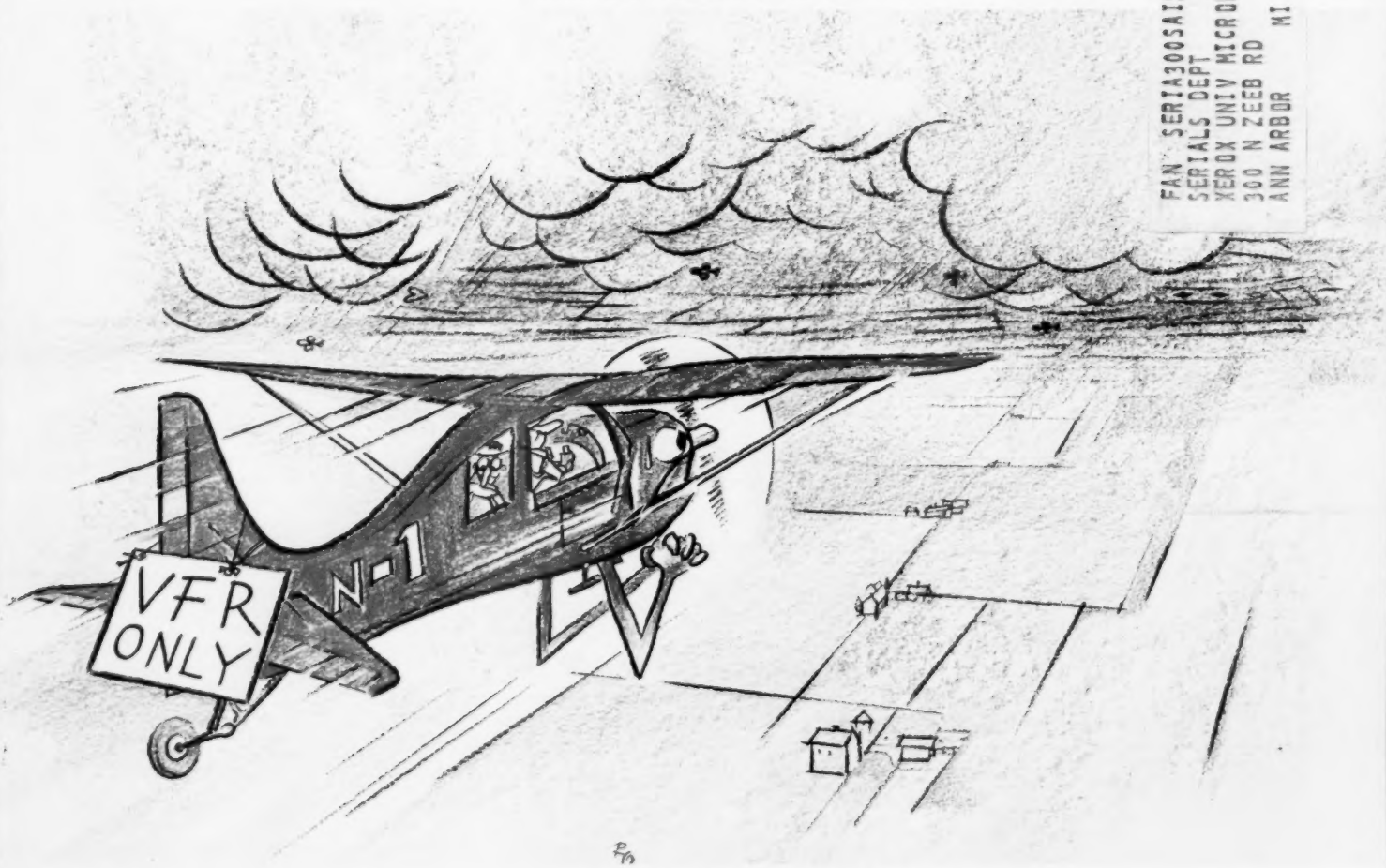

Your plane could get racked

Idea suggested by Al Barnes, Rocky Mountain Region, Denver, Col.